



BRIDGING THE GAP

Your Connection To Engineering Services

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SURVEYING BRIDGES FROM THE SKY, SEA, AND LAND

Sometimes it takes a three-fold approach to provide comprehensive data when surveying bridges.

Caltrans Bridge Design's Office of Photogrammetry and Preliminary Investigations (OPPI) and Caltrans Division of Design, Office of Surveys in the Los Angeles area (District 7) completed a multi-sensor remote sensing survey of the Vincent Thomas Bridge which links San Pedro to Los Angeles on State Route 47. The unique nature of the project site and complexity of the structure inspired an innovative approach to preliminary data collection by District 7 Surveys in partnership with OPPI.

The bridge's 60-year-old deck is rapidly deteriorating due to concrete fatigue from high car and heavy truck traffic. Caltrans proposes to replace the bridge deck and seismic sensors to preserve the functionality and integrity and enhance safety.

In May 2023, the OPPI airborne and bathymetric Architecture and Engineering survey consultant collected high-density airborne light detection and ranging data and medium format aerial imagery used to produce a natural color point cloud of the upper bridge structure, including towers, supporting safety, and traffic flow during data acquisition. Other products provided include Digital Terrain Models (DTM), topographic mapping, natural color digital ortho-rectified imagery, and oblique imagery.

A multi-beam bathymetric/hydrographic survey collected 3D data underwater that was classified by features including water and pylon and used to create a DTM of the sea floor under the bridge.

District 7 established the horizontal and vertical project control, provided GPS support during OPPI's survey efforts, and performed terrestrial laser scanning producing detailed point clouds of the approach structures. Currently, they are preparing to perform deformation monitoring of the bridge during the deck replacement.

A unique feature of this project was the vessel-based mobile LiDAR data collected along the underside of the bridge. The vessel LiDAR point cloud data of the underside of the bridge and imagery are deliverables that will be useful during the deck replacement. Data from multiple sensors that produce different 3D data sets and derived deliverables provide advantages for modeling key structural elements that will be used during the design and construction of the deck replacement.

This survey produced data that supports safety, efficiency, and collaboration which will benefit the Vincent Thomas Bridge deck replacement project and contribute to keeping the public and personnel safe during the project.

